



Problem of the Week

Problem A and Solution

Birthday Mode

Problem

Jaylen and Julia are in different classes at school. They both take a survey of the birth month of their classmates. They record each birthday month as a number, with January = 1, February = 2, March = 3, and so on.

Here are their two data sets:

Jaylen: 4, 5, 4, 8, 9, 3, 5, 6, 3, 4, 11, 6, 5, 12, 10, 12, 3, 1, 2

Julia: 12, 3, 4, 3, 5, 7, 8, 3, 6, 4, 11, 11, 6, 5, 3, 9, 10, 10, 9, 3, 5

A new student comes into the school and joins one of their classes. After adding the new student's birthday information to the survey results, Jaylen and Julia notice that the modes of the two data sets are the same. (The mode of a data set is the value that appears most often.)

In what month was the new student born, and whose class did they enter?

Solution

We start by finding the mode of each of the data sets. To do so, we can make a table of the frequencies of each value in the data set:

Jaylen's data:

Month:	1	2	3	4	5	6	7	8	9	10	11	12
Frequency:	1	1	3	3	3	2	0	1	1	1	1	2

Julia's data:

Month:	1	2	3	4	5	6	7	8	9	10	11	12
Frequency:	0	0	5	2	3	2	1	1	2	2	2	1

Before the new student arrived, the mode of Julia's data was 3, since that value appears the most often (5 times).

There is a three-way tie for the mode of Jaylen's data, since the values 3, 4, and 5 all appear 3 times in the data set.

Since the modes of the two data sets are the same after adding only one more value to the data, then the two data sets must both have a mode of 3. If the new student joins Jaylen's class, and the student's birth month is March, then there will be 4 students that have March as their birthday month. With this update, the mode in Jaylen's data set is 3, the same as the mode of Julia's data set.

Note that the mode is the same for each data set, but the actual frequency of the mode value is different in the two classes.